



FasTrak DSL

Frequently Asked Questions

Does Pacific Bell require regulatory approval to offer DSL service?

Yes. Pacific Bell has received the go ahead from the California Public Utilities Commission to begin offering *FasTrak* DSL service as part of a market trial. Participation in the market trial is voluntary. Customers may discontinue the service at any time and Pacific Bell may remove the service from market trial at any time. The trial is scheduled to conclude not later than August 31, 1998. The terms and conditions during the market trial may be different once *FasTrak* DSL service is offered under tariff.

When will Pacific Bell file for a tariff for DSL service?

We expect to file for a tariff with the California Public Utilities Commission in 1998.

When and where will *FasTrak* DSL be available?

DSL is available in selected Central Offices in Danville, San Ramon, Walnut Creek, San Jose, Burlingame, Los Altos, Mountain View, Palo Alto, Redwood City, Santa Clara and Sunnyvale. Effective mid-April, DSL will be available in Pasadena and North Hollywood.

Where will you be introducing *FasTrak* DSL in 1998? 1999?

We will be expanding to neighboring communities in the Bay Area and extending the market trial to selected areas in Southern California. We are currently evaluating markets to determine areas of highest demand.

Why a limited roll-out?

Because *FasTrak* DSL technology is rapidly evolving, we're working with our vendors to roll out the most innovative product available. We are using the initial roll-out to make any minor adjustments necessary to provide the most effective product.

What is xDSL or DSL?

DSL stands for high-speed Digital Subscriber Line. It provides a

dedicated digital circuit from your home to the telephone company's central office, using normal, copper telephone line. DSL also provides a separate channel for voice phone conversations, which means analog calls (voice, fax, etc.) can be carried at the same time high-speed data is flowing across the line. xDSL is a generic term that includes several variations:

ADSL (Asymmetric Digital Subscriber Line); 1.5 Mbps/64 Kbps-384 Kbps.

HDSL(High-bit-rate Digital Subscriber Line); 1.5 Mbps/1.5 Mbps.

SDSL (Single-line Digital Subscriber Line); 1.5 Mbps/1.5 Mbps.

VDSL (Very high-data-rate Digital Subscriber Line); 13 Mbps-52 Mbps/1.5 Mbps- 2.3 Mbps.

IDSL (ISDN Digital Subscriber Line); 128 Kbps/128 Kbps.

RDSL (Rate Adaptive Digital Subscriber Line)various speeds

What DSL configurations will you be offering?

We are currently offering two speed packages; an asymmetrical configuration with up to 1.5 Mbps downstream and up to 384 Kbps upstream and a symmetrical service of up to 384 Kbps.

What are the benefits of each?

A 384/384 service provides a great increase in speed for small business users and others accessing the Internet and hosting a web site. It also provides increased speed for many telecommuters downloading files from the corporate office and using the world wide web. 1.5/384 access provides additional speed for small offices and others with more intense usage requirements.

Are there any unique service limitations associated with DSL?

Yes. Customers must be within two to three miles of their central telephone switching office to receive the bandwidth benefits of DSL.

So, what speeds are guaranteed?

The actual throughput rate that a customer obtains may be impacted by conditions on the associated ISP network, the Internet, or their associated corporate LAN, among other things. Pacific Bell will make every attempt to connect the customer's service at the optioned speed. Also, it is important to note that DSL service is provided with a best-effort (Unspecified Bit Rate) Quality of Service on the ATM backbone, and as such, does not guarantee a specific constant throughput rate. With this distance limitation doesn't this mean that not everyone who wants DSL service from

Pacific Bell will get it? In the beginning, yes. We believe that 70 - 75% of customers out of a given central office will qualify for the service. Additionally, the evolution of network technology eventually will allow us to reach the small percentage of customers who are on the most distant ends of our local networks.

Will *FasTrak* DSL service include transmission of regular voice telephone service with DSL?

Yes, *FasTrak* DSL service will share a customers' POTS line without affecting their simultaneous use for placing and receiving voice calls.

Are industry standards in place for xDSL?

Yes. The industry standard is discrete multi-tone (DMT). This is the type of ADSL technology being deployed by Pacific Bell.

What is the UAWG?

The Universal ADSL Working Group (UAWG), is composed of leading PC industry, networking, and telecommunications companies, working together to develop a set of contributions building on the present T1.413 standard intended to create quick deployment and adoption of Universal ADSL. With the goal of providing consumers with assurance that products and services will work together, the UAWG's work will complement current equipment deployment of full-rate ADSL and help to provide a seamless migration path from today's modems.

Is Pacific Bell a member of the UAWG?

Yes. Pacific Bell, through its parent corporation SBC Communications, Inc. is an active member of the UAWG.

Will *FasTrak* DSL services replace *FasTrak* ISDN and analog modems?

No. There is some market overlap between ISDN and DSL services. However, we firmly believe ISDN and DSL are complementary services in our continuum of *FasTrak* family of offerings for telecommuters, home business operators and other remote users and they will coexist for years to come.

Key points:

We are not singling out DSL service. This new service will be part of our *FasTrak* product continuum, offering a higher bandwidth. These products will coexist for many years to come. *FasTrak* DSL services are not replacements for *FasTrak* ISDN, but offer optional

higher speeds.

Why would customers want *FasTrak* ISDN or analog modems when they could have *FasTrak* DSL services?

The introduction of *FasTrak* DSL service is an example of how Pacific Bell continues to be the leader in offering a wide selection of state-of-the-art solutions. Our *FasTrak* product line offers a continuum of services designed to meet the different speed, application and price needs of our customers.

Our products offer services to satisfy the needs of a wide range of users and applications from those using analog modems to those needing the higher performance of *FasTrak* ISDN at 128 Kbps and *FasTrak* DSL at either 384 Kbps or 1.5 Mbps.

Customer needs will govern the service they select. For example, as many customers become more familiar with the Internet, they will continue to demand higher and higher bandwidth. Pacific Bell and ISPs will have to step up to this trend by providing networks capable of greater speeds.

Will business customers replace their existing *FasTrak* DS1 (T1) service with *FasTrak* DSL?

We don't believe so, although there may be some overlap of the services. There are clear technological differences: DS1 is 1.5 Mbps both ways, which is important to many business applications. DS1 is a proven technology. While our technology tests demonstrate that *FasTrak* DSL is very reliable, businesses tend to rely on established technologies when business critical data is at stake. Many DS1 applications are related to voice service; DSL is for data only. Also, DSL requires Pacific Bell *FasTrak* ATM Cell Relay Service access at the host site; DS1 is a dedicated point-to-point service.

Why would customers want *FasTrak* Frame Relay or T-1 service when they could have *FasTrak* DSL services?

The introduction of *FasTrak* DSL service is an example of how Pacific Bell continues to be the leader in offering a wide selection of state-of-the-art solutions. Our *FasTrak* product line offers a continuum of services designed to meet the different speed, application and price needs of our customers.

Our products offer services to satisfy the needs of a wide range of users from those using analog modems to those needing the higher performance of *FasTrak* services running up to and beyond 1.544 Mbps and above.

Customer needs and applications will be the primary criteria for selecting a high speed data service from the *FasTrak* group of high speed data offerings. Other factors will no doubt include: DSL availability and the investments in hardware and expertise that customers have already made to support their existing networks.

Key points:

FasTrak Frame Relay and T-1 Available virtually everywhere in the Pacific Bell serving area. Excellent for Internet and corporate-computer-network access. Frame Relay is an excellent choice for enterprise networking where many points must interconnect with each other. *FasTrak* DSL Services Limited availability in 1997; broader deployment in 1998-99. Simultaneous data over voice capability; no need for a second line. Excellent for telecommuting; and Internet and corporate-computer-network access where very high speeds are desirable and many sites interconnect with one host. Requires ATM at the host location Limited to one end point initially

Will DSL help relieve any of the network congestion we've been reading so much about?

Yes. All of our customers will benefit--both heavy data users and voice customers. Here's why: A growing phenomenon among today's Internet users is the user who remains logged onto our switched voice network for many hours each day. However, our switched network was designed to handle millions of relatively short, voice-only phone calls. Too many online users logged on all day can cause the same kind of network delays in handling calls that normally occur only on holidays, such as Mother's Day, when hundreds of thousands of people all try to place calls at the same time. We can eliminate this problem by moving high-usage, online customers to a different part of our network for access to Internet service providers (ISPs).

What will Pacific Bell provide as part of its *FasTrak* DSL service?

Pacific Bell will provide a complete package, eventually including Internet access. Pacific Bell will work with customers to coordinate ordering, connecting to their corporate LAN or Internet service provider, as well as delivery and installation of their *FasTrak* DSL line, DSL modem, and the "splitter" that separates voice from data.

Will Alcatel be the only manufacturer of equipment for customers?

No. As part of our agreement with Alcatel, they will provide their

technical specifications to the vendor community. As a result, customers will eventually be able to buy equipment from a variety of companies.

What are the basic requirements for a corporate telecommuter to have *FasTrak* DSL service?

The corporate host needs an ATM connection to the Pacific Bell Fast Packet Network. The corporate host also needs to order a business line for the participating telecommuter. Arrangements will be made for the shipment/installation of the DSL modem and splitter per the ordering instructions of the corporate host.

Will you have to address the same service delivery hurdles as *FasTrak* ISDN?

No. Many of the hurdles ISDN had to navigate to become such a popular service, don't exist for *FasTrak* DSL. For example, equipment-DSL and ISDN-is self configuring. There are no "SPIDs" to set on DSL. DSL is not dependent on a particular manufacturers' switches. With DSL, there's no need to install a second line as a hedge against power outages since standard voice service operates independently of DSL on the same line. DSL and ISDN still need to undergo the same local loop qualification, which requires some research. However, we've streamlined much of that process.

Still have questions? Send them to adsl-info@pacbell.com.

► go to
fastrak dsl

help me
find a solution

how do other
people use it?

good ideas
and special offers

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Before the
FEDERAL COMMUNICATIONS COMMISSION
 Washington, D.C. 20554

In the Matter of)	
)	
The Public Utility Commission of Texas)	CCBPol 96-13
)	
The Competition Policy Institute, IntelCom)		CCBPol 96-14
Group (USA), Inc. and ICG Telecom Group,)	
Inc., AT&T Corp., MCI Telecommunications)	
Corporation, and MFS Communications)	
Company, Inc.)	
)	
Teleport Communications Group, Inc.)	CCBPol 96-16
)	
City of Abilene, Texas)	CCBPol 96-19
)	
Petitions for Declaratory Ruling and/or)	
Preemption of Certain Provisions of the)	
Texas Public Utility Regulatory Act of 1995)	

MEMORANDUM OPINION AND ORDER

Adopted: September 26, 1997

Released: October 1, 1997

By the Commission: Chairman Hundt and Commissioner Ness issuing separate statements.

Table of Contents

	Paragraph No.
I. INTRODUCTION	1
A. Overview and Summary	1
B. Background	17
1. Procedural History	17
2. The Telecommunications Act of 1996	20
3. Texas Public Utility Regulatory Act of 1995 (PURA95)	24
4. The Petitions	31
II. DISCUSSION	33
A. Legal Bases For Preemption	33
1. Preemption of State Regulation Pursuant to Section 253 of the Act ..	34
2. Preemption of State Regulation That Conflicts with Federal Law	46

B.	Application of Preemption Analysis To Challenged Provisions of PURA95 and Texas Commission Decisions	55
1.	Certificate of Operating Authority (COA)	57
2.	Service Provider Certificate of Operating Authority (SPCOA)	109
3.	Prohibition on Entry by Municipalities	173
4.	Provisions Regarding Usage-Sensitive Rates for Resale of Local Loops	191
5.	Certification Requirement for IntraLATA Toll Dialing Parity	198
6.	Moratorium on Reductions in Intrastate Switched Access Charges ..	203
7.	Texas Commission Decision Upholding the Prohibition on Resale of Centrex Service	214
III.	CONCLUSION	227
IV.	ORDERING CLAUSES	230
APPENDIX A	Parties to the Proceeding	
APPENDIX B	Selected Provisions of PURA95	

I. INTRODUCTION

A. Overview and Summary

1. On February 8, 1996, the Telecommunications Act of 1996 (1996 Act) became law.¹ As the Supreme Court recently noted, the 1996 Act "was an unusually important legislative enactment" that changed the landscape of telecommunications regulation.² Through this comprehensive amendment to the Communications Act of 1934 (Communications Act or Act), Congress sought to establish "a pro-competitive, de-regulatory national policy framework designed to accelerate rapidly private sector deployment of advanced telecommunications and information technologies and services to all Americans *by opening all markets to competition*."³ Congress thus rejected the historic paradigm of telecommunications services provided by government-sanctioned monopolies in favor of a new paradigm that encourages the entry of efficient competing service providers into all telecommunications markets. Congress envisioned the emergence of robust competition among multiple service providers in all industry segments,

¹ Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56, *codified* at 47 U.S.C. §§ 151 *et seq.* (1996 Act). Hereinafter, all citations to the 1996 Act will be to the 1996 Act as *codified* in Title 47 of the United States Code.

² *Reno v. ACLU*, No. 96-511, 1997 WL 348012, at *7 (U.S. June 26, 1997).

³ S. Conf. Rep. No. 104-230, 104th Cong., 2d Sess. 1 (1996) (Conference Report) (*emphasis added*).

under section 253, that enforcement of the build-out requirements would "have the effect of prohibiting" AT&T, MCI and Sprint from providing service contrary to section 253(a) due to the substantial financial investment involved and the comparatively high cost per loop sold by a new entrant.¹⁹⁷ In making this finding, we reject SWBT's argument that the COA build-out requirements do not violate section 253(a) of the Act because "with their vast resources and access to capital, [AT&T, MCI, and Sprint] can easily satisfy the modest build-out requirements associated with a COA."¹⁹⁸ Although PURA95 permits COA holders to enter local exchange markets in Texas in areas as small as 27 square miles, as national carriers, the business plans of AT&T and MCI may reasonably contemplate entry on a statewide basis and, indeed, AT&T alleges in this proceeding that its plans call for statewide entry.¹⁹⁹ Further, statewide entry is consistent with Congress' goal of rapid and widespread entry by new competitors in the local exchange market.²⁰⁰ And Congress expressly recognized that construction of redundant networks would be very costly and time-consuming, and therefore provided requesting carriers with the right to obtain non-discriminatory access to unbundled network elements and to resell the services of incumbent LECs.²⁰¹

79. Under PURA95, statewide entry by COA holders would require massive investment.²⁰² For example, AT&T estimates that complying with PURA95's COA build-out

¹⁹⁷ See AT&T Comments at 7-8 ("The Texas Law . . . requires a monopoly-sized investment for carriers that not only have no monopoly themselves, but that will be able to obtain customers only to the extent they can win them away from an entrenched monopolist. No rational business will invest capital under such conditions."); MCI Petition at 12 ("Before a potential new entrant will be permitted to serve a single customer, these provisions force the company to spend millions of dollars to begin to build out to all customers in a 27 square mile area, *regardless of the number of customers in that area actually served by the new entrant*. The effect of these requirements is to make entry into most local exchange markets economically impossible.") (emphasis in original).

¹⁹⁸ SWBT Comments at 17-19. See also SWBT Reply Comments at 13.

¹⁹⁹ See AT&T Reply Comments at 8-9 ("AT&T intends, and has the statutory right, to enter Texas on a statewide basis, and not even SBC can dispute that as applied to that service area the build-out requirement imposes massive and prohibitive costs of entry."). See also MCI Reply Comments at 8 ("No new entrant will have the resources to build-out the entire state of Texas, so these requirements will surely have the effect of prohibiting entry into some service areas).

²⁰⁰ See Conference Report at 113.

²⁰¹ See Conference Report at 148 ("This conference agreement recognizes that it is unlikely that competitors will have a fully redundant network in place when they initially offer local service, because the investment necessary is so significant."). In addition, the Eighth Circuit similarly noted that "Congress recognized that the amount of time and capital investment involved in the construction of a complete local stand-beside telecommunications network are substantial barriers to entry, and thus required incumbent LECs to allow competing carriers to use their networks in order to hasten the influence of competitive forces in the local telephone business." *Iowa Utils. Bd.*, 120 F.3d at 816.

²⁰² See PURA95 § 3.2531(c).

requirements in order to offer service throughout Texas would cost approximately \$5.3 billion.²⁰³ This estimate is based on a predicted thirty percent market share and the assumption that AT&T would obtain forty percent of the local loops needed to provide service as unbundled network elements from the incumbent LEC, as permitted by PURA95.²⁰⁴ AT&T notes that in such a scenario, its monthly total element long-run incremental cost (TELRIC)²⁰⁵ per switched line actually sold would be \$50.48²⁰⁶ versus \$17.11 for SWBT.²⁰⁷ We conclude that this cost differential under a state-wide build-out would effectively prevent AT&T from entering the local exchange market in Texas contrary to the requirements of section 253(a).

80. AT&T also contends that, despite SWBT's assertion to the contrary, the COA build-out requirements would have the effect of preventing COA holders from providing telecommunications services even though a COA holder may limit its entry to an area of 27 square miles and may limit its first year build-out obligations to ten percent of that total, or 2.7 square miles.²⁰⁸ We conclude that a build-out requirement would violate the requirements of section 253(a) if competitive entry were economically viable only when it was limited to a very confined geographic area. We further conclude that, under the PURA95 build-out requirements, entry in fact is not economically viable even when confined to such a limited geographic area. Specifically, AT&T estimated the costs of the COA build-out requirements when the provision of service is limited to the area served by a particular urban, suburban, and rural wire center. AT&T found that when the build-out is limited to ten percent of the subscribers in the urban wire center area, it would have a monthly cost per sold line of \$335.30 vs. SWBT's cost of \$12.51. In the case of the suburban area, the relationship would be \$336.60 per sold line for AT&T to \$14.87 for SWBT, and for the rural area the ratio would be \$2,208.40 for AT&T to

²⁰³ See Letter from Albert M. Lewis, Director and Senior Attorney, Federal Government Affairs, AT&T, to A. Richard Metzger, Jr., Deputy Chief, Common Carrier Bureau, FCC (September 10, 1997) (AT&T *ex parte* letter) at 3.

²⁰⁴ *Id.*

²⁰⁵ This would include both capital costs and operating expenses such as maintenance.

²⁰⁶ This represents the average cost per subscriber if AT&T were to offer service in Texas under these assumptions. Loop costs are weighted to reflect the relative portion of loops built by the CLEC and unbundled SWBT loops resold by the CLEC. *Id.* at Attachment 1, p. 7.

²⁰⁷ *Id.* at 3. This represents SWBT's TELRIC cost of local loops and traffic sensitive switched network elements assuming a 100 percent share in the SWBT serving areas. *Id.* at Attachment 1, p. 7.

²⁰⁸ *Id.* at 3-4.

**In the Matter of the Application of
Pacific Bell for Authority to Increase
and Restructure Certain Rates of its
Integrated Services Digital Network
Services**

Compaq Computer Corp. and Intel Corp.,

Complainants,

VS.

Pacific Bell (U 1001 C),

Defendant.

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Tel. No.: (415) 542-7712
Facsimile: (415) 543-0418**

Attorney for Pacific Bell

1 hotly contested market place undoubtedly will see even more
2 competition in 1998 providing customers even greater choices.
3

4
5 Q6. Please list the courses of action mentioned in the December 5th ruling.
6

7 A. The ruling mentions the following courses of action:
8

- 9 a. A refund to ISDN customers of the revenues Pacific has collected since
10 May, 1997, from the rate increase authorized in D.97-03-021.
11 b. A suspension of the ISDN rate increases authorized by D.97-03-021 until
12 such time Pacific is able to present documentation that it has satisfied the
13 service quality requirements of D.97-03-021 for a period of six consecutive
14 months.
15 c. A requirement that Pacific file monthly customer survey results relating to
16 the ISDN repair and installation service performance, stated separately for
17 residence and business customers.
18 d. Penalties for Pacific's failure to comply with D.97-03-021 in amounts
19 permitted pursuant to Sections 2107 and 2108 of the Public Utilities Code.
20
21

22
23 Q7. Please comment on the "courses of action" mentioned in the December 5th
24 Ruling of the Assigned Commissioner and the Administrative Law Judge.
25

26
27 A. The Commission does not need to take any of the courses of action mentioned
28 in the ruling for the following reasons:

- 1 1. From February to November of 1997, we had a 36.8% increase in
2 Personal (residential) ISDN customers.
- 3 2. From February to November of 1997, we also had a 30% increase in
4 Business and Centrex ISDN customers.
- 5 3. The removal of the rate increase would cause the ISDN products to
6 be offered below cost and that would likely have a negative impact
7 on competitors trying to compete in this marketplace with
8 competitively priced products.
- 9 4. Pacific Bell's ISDN service continues to have major competitive
10 pressures from a wide range of competitors. A recent research
11 study, conducted on Pacific Bell's behalf, estimates that from the
12 third quarter of 1996 to the third quarter of 1997 Business ISDN's
13 market share has dropped 6.3%. This reduction in market share is
14 attributed to TCG, Brooks Fiber and other competitors. Centrex
15 ISDN's market share has dropped by 1.6%. @ Home has continued
16 to expand its cable modem deployment in the East Bay while Cox
17 Cable and Ponderosa Cable, to name just two, are offering cable
18 modem services in Southern California and the East Bay. Companies
19 like COVAD in the East Bay have been approaching many larger
20 Pacific Bell accounts to replace ISDN services from Pacific Bell with
21 COVAD's Digital Subscriber Line (DSL) products. Other Competitive
22 Local Exchange Companies are reselling Pacific Bell local loops and
23 providing their alternative services to Pacific Bell customers. This
24
25
26
27
28

Pacific Telesis

1995 SUMMARY ANNUAL REPORT

“The future of our business will be built on our networks, the strengths of our people, and new products that give our customers greater choice, convenience, and control.”

Voice • Data • Long Distance • Internet Access

Personal Communications Services • Video Services

A T T A D I T I O N O F Q U A L I T Y

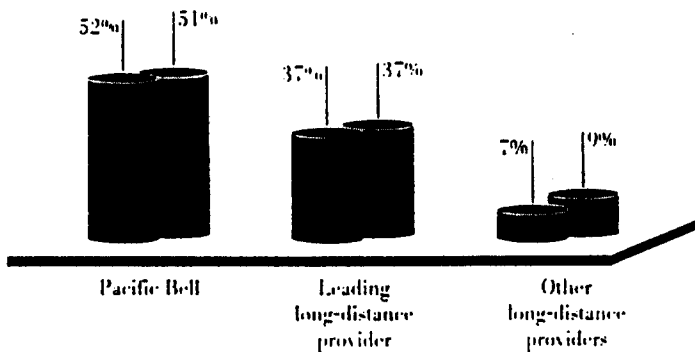
A D V A N T A G E

We're leveraging our networks and customer relationships to lead the market.

Understanding Our Customers

Among customers and industry groups, we've earned a reputation for quality and reliability by consistently meeting the needs of a communications-intensive market. Our service commitment and customer relationships will help us retain and win customers as we encounter competition and expand our business. An ad campaign launched in 1995—"The Pacific Bell Network: How Will You Use It?"SM—encourages Californians to broaden their expectations of us as we broaden our capabilities.

A Reputation for Service



Service: Key Driver of Choice

- Residential Customers
- Business Customers

When asked about key service attributes, customers rank Pacific Bell over the major long-distance providers. Providing efficient, personalized service and being easy to do business with are influential factors for Californians choosing a telecommunications brand.

This and other intensive business-building efforts are the products of a world-class marketing organization that combines in-depth knowledge of California and Nevada with insiders' views of the long-distance, cable TV, wireless, Internet, and data markets. We've also streamlined Pacific Bell to respond to customers more competitively. Now the strengths of our core business—from network engineering to operator services—are consolidated in one group that supports the efforts of three marketing units focused on consumers, businesses, and telecommunications service providers.

Several initiatives strengthen our presence in these markets. We're tailoring service packages to different industries and popular applications, such as telecommuting. Customized pricing plans and volume discounts reward customers for using our service. Strategic alliances expand our reach, reduce the risks of entering new industries, and help us introduce products faster. And as new competitors establish the connections they need to deliver service, we're creating product packages that encourage them to use our network rather than building their own facilities or partnering with others.

We're also delivering service in other innovative ways. Customers will be able to order and change service at their convenience over the Internet. And we plan to market services, such as wireless PCS, where customers shop, including warehouse stores and mass merchants.

EXHIBIT 2

Covad Communications Company
CC Docket No. 98-91
June 24, 1998



Defining “Digital” Loops – Avoiding Re-monopolization in a Digital World

Defining "Digital" Loops – Avoiding Re-monopolization in a Digital World

Overview

The FCC has required incumbent LECs to unbundled loops certified to carry digital signals, as well as analog signals, as ordered by the CLEC customer.¹ This decision by the FCC recognizes that the purpose of the Telecommunications Act of 1996 was not simply to promote competition for analog voice services but to unleash competitive and innovative forces in the industry that can bring entirely new and advanced telecommunications services to the American consumer. Unfortunately, implementation of the FCC's digital loop unbundling requirements remains to this date -- more than two years after passage of the 1996 Act -- woefully inadequate. The failure to fully implement Section 251(c)(3) with regard to digital loops is causing unnecessary delay in the availability of advanced, high bandwidth services to residential neighborhoods across the country.

Three shortcomings are clearly impeding the development of competition in the provision of high bandwidth digital services.

First, precise definitions of the ILEC's obligation to provide unbundled digital loops are not present. ILECs, such as Bell Atlantic, simply have not provided loops certified to support digital signals. Bell Atlantic seems to believe that "compliance" with FCC rules consists of allowing CLECs to order analog or ISDN loops and *hope* that xDSL technology works over them. SBC -- at least as regards Texans -- will not provide loops to CLECs that can be counted on to provide high bandwidth services.²

¹ See *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, First Report and Order, 11 FCC Rcd 15499, at ¶ 380 (1996) ("First Local Competition Order") (definition of an unbundled loop "includes . . . two-wire and four-wire loops that are conditioned to transmit the digital signals needed to provide services such as ISDN, ADSL, HDSL and DS1-level signals"), *aff'd in part and vacated in part sub nom. Competitive Telecommunications Ass'n v. FCC*, 117 F.3d 1068 (8th Cir. 1997), *aff'd in part and vacated in part sub nom. Iowa Utils. Bd. v. FCC*, 120 F.3d 753 (8th Cir. 1997), *cert. granted*, 66 U.S.L.W. 3484 (U.S. Jan. 26, 1998).

² See *Petition of the Association for Local Telecommunications Services (ALTS) for a Declaratory Ruling Establishing Conditions Necessary to Promote Deployment of Advanced Telecommunications Capability Under Section 706 of the Telecommunications Act of 1996*, CC Docket No. 98-78, May 27, 1998, pages 12-17

Second, even where such loops are available, pricing of "digitally conditioned loops", varies so widely as to impede competitive entry. Although ILECs reported to the FCC prior to the enactment of the 1996 Telecommunications Act that the costs of maintaining analog and digital loops were approximately the same,³ the recurring monthly prices for unbundled digital loops is often 20% higher than the price of analog loops. The lack of refined definitions for digital loops has left states attempting to implement Section 252(d) in a regulatory netherworld—without clear and concise descriptions of the ILEC's obligation to unbundle "digitally conditioned" loops, it is not surprising that prices vary widely among the states.⁴

Third, ILEC network modifications are increasing the extent to which copper loops terminate at remote terminals some distance away from the central office in Digital Loop Carrier ("DLC") systems. As digitalization is extended further towards residences, in no small part because of ILEC promises of xDSL offerings, the number of DLC-based loops will increase. DLC implementation inherently involves interface circuits (either analog or digital) that must be placed in a remote terminal between the residence and its serving central office. Since the xDSL "modem" at the residence must electronically match the digital interface at the remote terminal, if ILECs seek to limit equipment that can be placed at the remote terminal, those ILECs will be impeding the consumers right to select their own broadband CPE and the ability of CLECs to provide consumers with their choice of broadband CPE.⁵

Significant opportunities for ILECs to discriminate in favor of their own (delayed) digital service offerings will be created absent solutions to the problems that

³ See *Access Charge Reform*, First Report and Order, 12 FCC Rcd 15982, 16028-32 (1997) ("Access Charge Order") (comparing costs of standard analog loops and loops which have been conditioned for Basic Rate Integrated Service Digital Network ("ISDN") service). Indeed, NYNEX submitted data showing that loops certified for digital traffic actually cost less than analog-certified loops because they can be tested and maintained remotely. See *id.* at 16197-99.

⁴ For instance, in New York, Bell Atlantic justifies the cost difference between a "Premium Link" and an "Analog Link" on account that the "forward-looking" cost for a Premium Link differs than the "forward-looking" cost of an Analog Link because the forward-looking Premium Link contains fiber feeder and ISDN electronics deployed at a remote terminal. See Phase I Order, NYPSC Case Nos. 95-C-0657, 94-C-0095, 91-C-1174, April 1997. In contrast, the price for an ADSL-compatible loop from Ameritech in Illinois is *precisely* the same as an analog loop, a policy which rejects the notion that there is something "special" about the forward-looking cost of constructing digital loops which make such loops more expensive than the forward-looking cost of constructing analog loops. AT&T Communications of Illinois, Inc. Petition for Arbitration of Interconnection Rates, Terms and Conditions and Related Arrangements with Illinois Bell Telephone Company d/b/a Ameritech Illinois, Docket No. 96-AB-003 (Ill. Comm. Comm'n, Aug. 1, 1996).

⁵ In fact, service introduction is already deleteriously affected. Pacific Bell's insistence that CLECs provide xDSL services through its remote terminals designed only for the provision of ISDN limits end users to only ISDN speeds – less than a tenth of what would be nominally available using existing technology.

surround the unbundling of digital loops. ILECs will be able to impede the ability of CLECs to provide the best broadband services to residential customers as soon as commercially and technically possible.

Policy Objectives

It is now axiomatic that a significant transformation is underway. This transformation is marked not only by increased speeds delivering information to an end user, but also by a fundamental change in the form -- digital versus analog -- of use of the network and to a lesser (but competitively critical) extent in the constituent components of the network itself. From the perspective of a residential or small business user, the new all-digital, packet-based network is evolving from the old analog circuit-switched network. While bits and pieces of hardware are being added and substituted, the hundreds of millions of dollars worth of much depreciated (and -- by the ILECs -- *much* depreciated) twisted copper wires remain in place.

The Telecommunications Act of 1996 and the subsequent implementing regulations require the incumbent local telephone company monopolies to make available to new competitive carriers the twisted copper pair associated with each residence and collocation space in irreplaceable central offices to install their own state-of-the-art telecommunications equipment. However, the monopoly providers remain in control of these physical assets and the information that is necessary to their intelligent and cost-effective use. While statute and regulation require incumbent providers to supply facilities to new entrants, the increasing importance of packet-based technologies inevitably has led to competitive tension as established monopolies provide new entrants wholesale access to facilities while attempting to cement their existing monopolies by deploying their own chosen versions of the same telecommunications equipment.

The challenge for those who believe that a competitive environment will deliver the best service offerings at the lowest prices is to act continuously to ensure that one-time monopolies will not successfully manipulate their control over unique physical facilities to retard and thwart the rapid growth of start-up competitors.

Digital entrants remain critically concerned with the regulatory and commercial provisioning of "local loops" -- the aggregate facilities between a residence and its serving central office (or, perhaps, an intervening remote terminal). These loops cannot be viewed in isolation. Even if loops were ideally conditioned for digital service, inexpensive, and immediately available upon request, they would be of little use to a digital CLEC if that company were denied sufficient access to fully utilize the capability of the loops where they terminate. Similarly, such a digital CLEC might find its viability compromised if it were unable to interconnect data

telecommunications facilities so as to accept and deliver traffic upstream (via dedicated transport facilities, for example) consistent with the best technical and commercial practices applicable to its chosen and evolving network architecture. While anti-competitive strategies might seemingly affect only those facilities upstream from the local loop, the consequences of those actions will likely impact the practical implementation of high-speed, broadband access over the basic twisted copper pair of wires leading from the country's residential neighborhoods.

It is with these interrelationships in mind that this paper identifies the following public policy objectives to guide policy makers in their efforts to define adequately local loops certified to support digital transmissions (a "digital loop"):

- The facilities and interfaces comprising the digital loop should fully enable the continued development of competition in the provisioning of digital services to end users.
- Technological innovation in providing services over digital loops should be encouraged. New competitors should not be stymied by ILEC legacy equipment or operational methodologies. ILEC equipment decisions must not restrict the services competitors can provide over unbundled digital loops and must not restrict consumer choice of xDSL services.
- The potential anti-competitive effects of standards development must be taken into account. Interoperability should characterize any necessary standard. There must be strict parity afforded by ILECs to CLECs in the pre-ordering, ordering, installation, testing, maintenance and upgrading of all forms of loops, especially for digital loops.

Network Typology

A loop, historically, is the transmission facility from a customer premise to the central office. A loop "is typically a pair of copper wires."⁶ The overwhelming majority of loops, approximately 75%, are less than 18,000 feet in length, are simple, unaugmented ("nonloaded") twisted pairs of AWG 19, 22, 24, and/or 26 copper wire, and can carry analog transmissions as well as digital signals. Other loops have different characteristics, depending on whether they must be conditioned to carry analog or digital signals. For example, long copper loops, greater than 18,000 feet, often require the placement of periodically spaced inductors, called load coils, to compensate for the attenuation of voice transmission on longer facilities. Approximately 25% of all loops are not an end-to-end pair of copper wires because they are served by digital loop carrier ("DLC") systems, or have load coils placed on them or have excess bridged taps.

⁶ Testimony of William C. Deere for Pacific Bell, April 8, 1998, before the California Public Utilities Commission in R.93-04-003 and I.93-04-002 at 5, line 17.